



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/759,621	01/16/2004	Peter J. Hopper	100-18310 (P05271-D01)	1227
33402	7590	01/13/2006	EXAMINER	
LAW OFFICES OF MARK C. PICKERING			NGUYEN, HA T	
P.O. BOX 300			ART UNIT	
PETALUMA, CA 94953			PAPER NUMBER	
			2812	

DATE MAILED: 01/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/759,621

Applicant(s)

HOPPER ET AL.

Examiner

Ha T. Nguyen

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 October 2005.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-20 and 23-35 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 14-20 and 23-35 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 6-6-5 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Applicants' amendments in response to the Office Action mailed August 23, 2005, the replacement sheets filed on June 6, 2005, and Request for a Continued Examination have been entered and made of record. Following is an Office Action responding to the request.

Claim Rejections - 35 USC § 112

2. Claims 23-28 and 32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 23 recites the limitation "openings" in line 10 and claim 32, "metal region". There is insufficient antecedent basis for these limitations in the claims.

Claims 24-28 variously depend from claim 23, they are rejected for the same reason.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 1038 and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 2812

4. Claim 14-20 and 23-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krishnan (USPN 5998299) in view of Misawa et al. (USPN 6150725, hereinafter "Misawa").

Referring to Figs. 10-15D and related text, Krishnan discloses [Re claim 14] a method of forming a semiconductor device, the method comprising: forming a layer of conductive material 210 on a conductive region 202 and a layer of insulation material 201; etching to form a slot opening in the top surface of the conductive material, the slot opening having a bottom surface spaced apart from a bottom surface of the conductive material, a second length, a second width, a second height, etching the layer of conductive material to form a trace, the trace having a first length, a first width, a first height, a top surface, and a bottom surface, the examiner interpreted the first and second lengths being substantially equal because they are formed using the same mask 212. But it fails to disclose the claimed order and forming a layer of isolation material over the trace to fill up the slot opening. However, the missing limitation is well known in the art because Misawa discloses this feature (See Fig 10 (a), # 120, 121). Besides, selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results (See MPEP 2144.04 (d) citing *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946)). A person of ordinary skill is motivated to modify Krishnan with Misawa to form multilevel of connected conductors.

[Re claim 23] The combined teaching of Krishnan and Misawa discloses substantially a method of forming a semiconductor device, the method comprising: forming a layer of conductive material on a conductive region and a layer of insulation material; etching the layer of conductive material to form a trace, the trace having a length, a width, a height, a top surface, and a bottom surface; etching the trace to form a slot opening in the top surface of the trace, the slot opening having a bottom surface spaced apart from the bottom surface of the trace, and side walls that extend along the length of the trace; and forming a layer of isolation material over the trace to fill up the slot opening, as shown above.

[Re claim 29] Krishnan discloses substantially the limitations of claim 29, as shown above. It also discloses that the trace has a substantially planar top surface (see Fig. 15A). But it fails to disclose expressly a portion of each slot opening lying directly vertically over the conductive region. However, the missing limitation is well known in the art because Misawa

Art Unit: 2812

discloses this feature (See Fig. 6(a)), each of the openings between the conductive portions 112 are directly vertically over the conductive region 111.

[Re claims 15-16, 24-25, and 30-31] Khrisnan and Misawa disclose forming conductors in the form of loop, substantially in the same plane (see Khrisnan, Figs. 10-11C, Misawa, Figs 6(a)-8);

[Re claims 19, 26, and 33] Misawa discloses wherein the layer of isolation material contacts the layer of insulation material (see Fig. 7, # 120, 121 and 109).

[Re claims 20, 27, and 34] Khrisnan discloses wherein the conductive material is metal (see col. 5, lines 39-51);

[Re claims 17-18] wherein the trace is connected to a contact, a via 202;

[Re claim 32] wherein the conductive region is a via 202; and

[Re claims 28 and 35] wherein the slots are substantially equally spaced apart (see Figs. 15b-c).

Therefore, it would have been obvious to combine Krishnan with Misawa to obtain the invention as specified in claims 14-20 and 23-35.

Response to applicants' amendments

4. In view of applicants' cancellation of the claims, the rejection of claims 21-22 has been rendered moot.

In view of applicants' amendments to the claims, the rejections of claims 14-20, as stated in the above-indicated Office Action have been withdrawn.

In view of the new ground of rejection, applicants' arguments have been rendered moot.

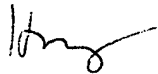
Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ha T. Nguyen whose telephone number is (571) 272-1678. The examiner can normally be reached on Monday-Friday from 8:30AM to 6:00PM, except the first Friday of each bi-week. The telephone number for Wednesday is (703) 560-0528.

Art Unit: 2812

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt, can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ha Nguyen
Primary Examiner
1- 6- 06